AD NUMBER
AD031993
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AUTHORITY
USAFSTC ltr dtd 8 Nov 1979; USAFSTC ltr dtd 8 Nov 1979

Shannon/bj

Ordnance Technical Intelligence Service
Aberdeen Proving Ground, Maryland

1225662

14 January 1954

ORDBG-OTI

MEMO REPORT NO. OTIO-30-2

SUBJECT: Soviet Hand Grenade, Offensive Type, Model RG-42

TO : Chief of Ordnance, Washington 25, D. C.

ATTN: ORDGU-IN

AUTHORITY: Ltr file APG 386.3/119, O.O. 386/2, dtd 30 Oct 51, subject: "Firing Program for Soviet Hand Grenade, Offensive Type, Model RG-42 (TB3-0035)"

1. Introduction.

a. The above-cited authority requested that a number of the subject Soviet hand grenades be utilized in a panel fragment test in accordance with methods used for obtaining the velocity, mass, angular distribution of fragments, and kill probability. The authority also requested that the time for fuze activation be recorded.

b. Memo Report No. OTIO-30-1, covering the initial phases of the panel fragment test of Soviet hand grenades, was submitted 10 Dec 52. This report gave information on the panel test procedures for obtaining fragmentation characteristics, on preliminary results of the test, on fuze activation time, and on physical and chemical examination of the grenade.

c. This final report summarizes the previously unreported procedures and results of the grenade tests completed between 13 Feb 52 and 6 May 53 as contained in APG Firing Record No. B-11012.

2. Materiel.

a. Of the total of fifteen Soviet offensive-type hand grenades Model RG-42 (FMAM 2173) previously described in detail in Memo Report No. OTIO-30-1, seven were statically detonated in the conduct of the panel fragment test and eight were statically detonated in the conduct of the mass recovery test. Detonation of the grenades was initiated by application of electric detonators M36, excepting rounds No. 7, 14, and 15 which used detonators M18 in combination with the electric detonators M36.

b. The facilities for the recovery of fragments and the recording of fragment velocities consisted primarily of six 8- x 4- x 3-feet wooden boxes, each filled with 1/2-inch-thick composition wallboard. Two of these boxes mounted flash screens of 0.020-inch dural immediately in front of the wallboard. A high-speed motion picture camera operating at 8000 frames per second was used to record fragment velocities.

3. Procedure.

a. The entire program was carried out under the supervision of the Bomb and Fragmentation Branch, Arms and Ammunition Div, D&PS. Four of the wooden boxes were used for the mass recovery of fragments and were placed side by side in an arc on the periphery of a circle having a 10-foot radius. The two boxes with flash screens were used for recovery of fragments for which velocities were recorded; these boxes were placed side by side in an arc on the edge of the circle directly opposite the other four boxes. The movie camera was placed in position to photograph the flash at the moment of detonation of the grenade and the flash caused by fragments striking the sheet of dural, thus recording the results of fragment velocities on film.

b. Eight grenades were statically detonated, singly, from the center of the circle and the mid-point of the height of the recovery boxes for the mass recovery-velocity phase of the test. Four of the grenades were detonated in a horizontal position and four were detonated in a vertical position. After detonation of each grenade the fragments were recovered from each box, weighed and photographed, and the exposed film from the movie camera was analyzed for the determination of fragment velocities.

4. Results.

a. Of the fifteen RG-42 grenades tested, all grenades functioned high order except numbers 14 and 15, which functioned low order.

b. The average instrumental velocities of fragments of test rounds No. 1 to 5 and No. 7 to 13 are given in inclosure 1.

c. Recovered velocity fragments and their respective weights and velocities are shown in APG Photos A85131, A88449, and A88451. These photos may be obtained from this station upon request.

d. Weight distribution of fragments recovered from the mass recovery test of rounds No. 8 to 13 are indicated in inclosure 2.

e. A tabulation of the average number of fragments and the average fragment weight for each position of suspension of the test grenades in the mass recovery test, rounds No. 8 to 13, is given in inclosure 3.

f. Angular distribution of hits on panels at the 15-foot radius is graphically reported in inclosure 4.

5. Conclusions.

a. In the panel test of the subject Soviet hand grenade, the grenade, when suspended horizontally, produced an average side fragment of 4.74 grains with an average velocity of 2758 feet per second over a

distance of approximately 14.4 feet; when suspended vertically, the grenade produced an average side fragment of 3.09 grains with an average velocity of 3192 feet per second over a distance of approximately 14.4 feet.

b. Results of the mass recovery phase of the test indicate that the RG-42 grenade will produce a fuze-end fragment of 3.01 grains with an average velocity of 4692 feet per second, a base-end fragment of 1.79 grains with an average velocity of 5124 feet per second, and a side fragment of 3.06 grains with an average velocity of 3526 feet per second. Of the recovered fragments, 54.6% by number and 73.8% by weight were of the 2.00- to 10.00-grain group. Velocities measured over a distance of 10 feet.

c. The checkerboard grid pressed into the fragmentation sheet coiled within the RG-42 grenade, does not aid in confining fragments to a particular size, weight, or number.

6. Recommendations.

a. It is recommended that this report be referred to the Research and Development Division, OCO, for study to determine the desirability of calculating the lethal area of the subject grenade and the preparation of a graphical contour presentation to illustrate the lethal area.

b. In addition this study should consider the desirability of a test of the RG-42 grenade without the fragmentation sheet, and a test of the RG-42 grenade with an explosive filler of Composition B, which, it is believed, will considerably improve its efficiency.

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4 Incls
1. Instrumental Velocity-Fragment Mass Data--Confidential (1 page)
2. Fragment Recovery--Confidential (1 page)
3. Average Number of Fragments & Average Fragment Weight--Confidential (1 page)
4. Angular Distribution of Hits--Confidential (1 page)

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INSTRUMENTAL VELOCITY-FRAGMENT MASS DATA

Average for Rounds No.	Average Sample Size	Average Fragment Weight (gr.)	Average Instrumental Velocity (f.p.s.)	Distance Grenade to Flash Screen (ft.)	Fragment Spray	Suspension
1 and 2	23.5	4.74	2758	14.41	Side wall	Horizontal
3 thru 5	14.7	3.09	3192	14.44	Side wall*	Vertical
6	No velocities obtained nor fragments recovered.					
7	5.0	2.60	2689	14.50	Side wall*	Vertical
8 and 12	72.0	3.01	4692	9.82	Fuze end	Horizontal
9 and 13	41.0	1.79	5124	9.85	Base end	Horizontal
10 and 11	55.0	3.06	3526	9.86	Side wall	Vertical

* Lower section of side wall. Grenade was suspended vertically and full side wall fragment spray was not sampled with the flash screen.

Incl 1

FRAGMENT RECOVERY

Weight Intervals (gr.)		Distribution of Fragments by Number and Weight						
		Round 8	Round 9	Round 10	Round 11	Round 12	Round 13	Totals
0.00--0.50	Number	12	37	16	13	33	23	134
	Weight	3.84	8.98	5.54	4.08	8.22	7.30	37.96
0.51--1.00	Number	8	18	32	21	8	20	107
	Weight	6.02	12.36	25.60	16.10	6.22	15.66	21.96
1.01--1.50	Number	3	9	17	17	2	6	54
	Weight	3.66	10.92	21.70	21.08	2.34	7.06	66.76
1.51--2.00	Number	1	6	20	19	1	6	54
	Weight	1.54	10.44	34.40	33.28	1.98	10.82	92.46
2.01--3.00	Number		8	25	35	4	5	77
	Weight		20.96	62.48	85.86	9.48	13.62	192.40
3.01--5.00	Number		8	23	41		10	82
	Weight		29.24	91.10	158.96		36.72	316.02
5.01--10.00	Number		5	32	44		10	91
	Weight		35.68	219.24	306.08		66.02	627.02
10.01--20.00	Number		4	2	6	1	10	23
	Weight		64.34	21.27	72.78	14.14	147.04	319.57
20.01--50.00	Number			3		1	1	5
	Weight			72.08		21.38	28.84	122.30
Over 50.00	Number		1				1	2
	Weight		282.00				51.64	333.64
Totals	Number	24	96	170	196	50	92	628
	Weight	15.06	474.92	553.41	698.22	63.76	384.72	2190.09

Incl 8

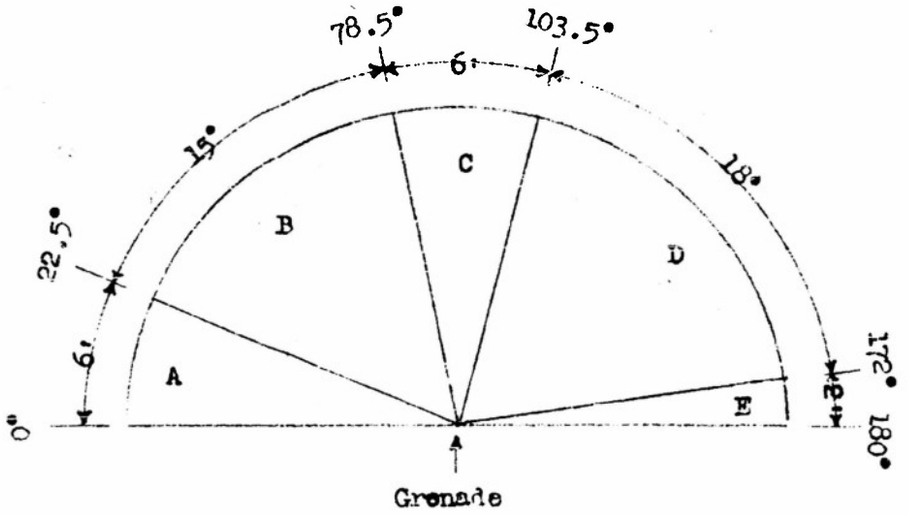
AVERAGE NUMBER OF FRAGMENTS AND AVERAGE FRAGMENT WEIGHT
FOR EACH POSITION OF SUSPENSION

Weight Intervals (gr.)		Distribution of Fragments by Number and Weight		
		1*	2**	3***
0.00--0.50	Number	22.5	30.0	14.5
	Weight	0.268	0.271	0.332
0.51--1.00	Number	8.0	19.0	26.5
	Weight	0.765	0.737	0.674
1.01--1.50	Number	2.5	7.4	17.0
	Weight	1.200	1.199	1.258
1.51--2.00	Number	1.0	6.0	19.5
	Weight	1.760	1.772	1.735
2.01--3.00	Number	2.0	6.5	30.0
	Weight	2.370	2.660	2.472
3.01--5.00	Number		9.0	32.0
	Weight		3.664	3.207
5.01--10.00	Number		7.5	38.0
	Weight		6.780	6.912
10.01--20.00	Number	0.5	7.0	4.0
	Weight	14.140	15.092	11.758
20.01--50.00	Number	0.5	0.5	1.5
	Weight	21.380	28.840	24.027
Over 50.00	Number		1.0	
	Weight		166.820	

* Suspended horizontally for base fragment recovery - Rounds 8 and 12.
** Suspended horizontally for fuze fragment recovery - Rounds 9 and 13.
*** Suspended vertically for main spray recovery - Rounds 10 and 11.

Incl 3

DISTRIBUTION OF HITS ON PANEL OF 15-FOOT RADIUS
PRESENTED BY HORIZONTALLY SUSPENDED TEST ROUNDS NO. 1 AND 2



	Areas				
	A	B	C	D	E
Perforations	22	2	17	1	4
Penetrations	109	44	60	31	19
Hits per square foot	2.4	0.34	1.4	0.2	1.3
Square feet in area	54	135	54	162	18
Angle of distribution	22.5°	56°	25°	68.5°	8°

The arc formed by the test panel of one-inch dressed Ponderosa pine boards with a height of 9 feet contained 423 square feet of test surface.

Incl 4